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DESKTOP PUBLISHING

Using PageMaker 3.0 on the Macintosh, IBM PC and PS/2

JAN EAKINS

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Desktop Publishing with PageMaker

by JAN M. EAKINS

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DESKTOP PUBLISHING
USING PageMaker 3.0 ON THE MACINTOSH, IBM PC and PS/2

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Preface

Desktop publishing has brought new communications *potential* to hundreds of thousands of people who never before produced a publication. Unfortunately, many novice publishers create printed communications that fail to meet their expectations because they lack the range of knowledge necessary for success: (1) thorough familiarity with a desktop publishing software package and (2) at least a smattering of knowledge about graphic design and (3) publishing.

While it's becoming easier to locate a course on desktop publishing, it remains next to impossible to find one that includes graphic design techniques and publishing procedures—and the effort to obtain this information elsewhere can be tedious, time-consuming, frustrating, confusing, jargon-bound, and ultimately disappointing as the reader mired in the detail of a standard text on publishing or the student bogged down by jargon in a graphic design class can attest. *Desktop Publishing With PageMaker,* and the accompanying student exercise diskette, pares the three essential desktop publishing skills down to easily grasped, jargon-free principles and provides one of the few, if not the only, tools to master desktop publishing in the context of both graphic design and publishing.

The book focuses on the essentials of the PageMaker software package, six basic design principles that can be used to organize and embellish any publication, and the steps to reproduce a publication within budget and schedule. It applies my nearly 25 years experience with printed communications to the desktop publishing process, drawing on my B.A. and M.A. degrees in journalism and mass communications from the University of Wisconsin-Madison and synthesizing my experiences with graphic designers and printers to

produce hundreds of printed communications ranging from a student newspaper in Costa Rica to judicial campaign literature in central Wisconsin to the first PageMaker training manual. It also reflects the more than three years I worked as a consultant to Aldus Corporation and talked and worked with hundreds of people who have learned and use the PageMaker desktop publishing package.

Careful scrutiny of *Desktop Publishing With PageMaker* and hands-on sessions with the accompanying exercises can turn anyone into a competent desktop publisher within a matter of weeks, as my students at the 1989 National Computer Educator's Institute amply demonstrated.

- The text introduces the most important basic and intermediate PageMaker features, sifted from thousands of capabilities, and reinforces them through a series of exercises available on a PC or Macintosh diskette.
- Practical tips and shortcuts from designers and others who use PageMaker—many of which are not published elsewhere—enrich the learning process.
- Design techniques are introduced early in the course so students can apply them to the exercises.
- Margin notes emphasize important points through definitions and examples.
- Discussions on project planning and publishing options round out the guidelines for producing good-looking, hard-working printed communications from start to finish.

The publication of *Desktop Publishing With PageMaker*r completes a circle begun in April 1985 when I first met with Paul Brainerd, president of Aldus Corporation, to discuss the possibility of my consulting on marketing the soon-to-be-released PageMaker 1.0. During the next three and a half years, I worked with Paul and his staff to tell people about the ability of desktop publishing to speed the publishing process and to teach them about PageMaker's ever-growing capabilities. This book draws on what I learned from Aldus' graphic designers, sales staff, software engineers, editors, and documentation writers during that time—my thanks to Donna Belk, Daniela Birch, Paul Brainerd, Brian Carman, Aliza Corrado, David Hastings, Jann Hattrup, Sandy Hogan, Karen Howe, Michele Palmer, Laura Perry, Phil Johanson, Patrick Rafter, Bridget Ragan, Jennifer Seman, Ann Senechal, Nicki Vick, and all the others who shared their desktop publishing expertise and ideas.

My appreciation also goes to the dozens of PageMaker owners who have described the joys and frustrations of learning and using desktop publishing. I am especially grateful to those who have

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generously allowed me to present samples of their work in this book: Bob Grindeland of Team Design; David Imanaka of Imanaka and Company; Bill Powers and Lino Espinosa of Powers Stenson & Espinoza; Bob Lee of Bob Lee Graphics; Bob Reznik, Executive Director of the Texas Back Institute; and Ted Leonhardt and John Laney of The Leonhardt Group.

Although writing is primarily a solitary activity, no book of this complexity can be written without the encouragement and assistance of numerous individuals. I offer heartfelt thanks to John Haywood for lending his ear and his suggestions to my creative efforts from start to finish. Paula Wong's insightful review of the book's first draft helped organize vast amounts of information into a cohesive whole. Fellow writer David Kroenke's shared insights—as a professional and a friend—stimulated many new thoughts. Designer Pat Rogondino's good humor and stick-to-it attitude helped smooth the inevitable peaks and valleys of such a project.

Suggestions from my students at the National Computer Educator's Institute at Central State University in Edmond, Oklahoma helped fine-tune the book's text and student exercises. A special pat on the back goes to Marilyn St. Clair of Weatherford College for her numerous helpful comments. Thanks too to Ron Cole of Genesee Community College, Cathy Halloway of Tidewater Community College, Jerry Jaffe of Kennedy-King College, Mary Kohls of Austin Community College, Iva Lee of McLennan Community College, Ray Pedrazine of San Antonio College, Elynor Seck of Hutchinson Community College, L. Louise Van Osdol of Johnson County Community College, and Ray Woodcock of Boulder Technical Center.

Bob Grindeland's design expertise added polish to the student exercises, while professional photography from Doug Plummer supplied flair to the scanned halftone examples in Chapter 9.

Finally, I am grateful to the people at Meridian Software, especially Eric and Hsin-Chi Halsey, and to John Haywood for the use of their PC systems to test the student exercises under various conditions.

Jan M. Eakins
Seattle, Washington

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1

Introduction to Desktop Publishing

What Is Desktop Publishing?

You may not consider yourself a publisher, but you are—***publishing*** is the production of any printed communication intended for another person, whether it is typewritten, laser printed, or typeset. This production process includes placing text and graphics on a page and reproducing the page for distribution. Produce a business proposal, a resumé, or a high school yearbook and you follow the same procedures as publishers of books and magazines, on a less elaborate scale. No matter the kind of document produced or the technique used, all publishers follow five basic steps:

1. Plan the publication.
2. Prepare the copy (text).
3. Prepare the charts and illustrations.
4. Make up the publication's pages (prepare them for reproduction).
5. Reproduce the publication.

Desktop publishing computerizes and accelerates the entire publishing cycle. You define a page's design framework on the computer screen and fill the framework with text and graphics created in other software applications, then edit or resize them to fit. You draw ***rules*** (lines), boxes, or circles with built-in tools. When you complete the page, you print it and have it reproduced on a photocopy machine or a commercial printing press.

But before we proceed with a closer look at the elements of desktop publishing, let's quickly review the history of publishing to better understand the nature of the process.

DTP
The term *desktop publishing* is sometimes shortened to DTP.

Terms to Remember

- *publishing*
- *desktop publishing*
- *rule*
- *DTP*

The Development of Publishing

A review of typesetting and printing advances offers a good starting point for understanding how desktop publishing builds on and streamlines traditional publishing methods.

Movable Type Revolutionizes Publishing

Word Origins
Movable type was stored in a tray called a *type case*, with each character assigned an individual compartment. Capital letters were stored at the top of the case—the source of today's term *upper case* to describe capital letters. Other letters came to be refered to as *lower case* because of their position in the type case.

You probably were taught that Johann Gutenberg's popularization of movable type during the 15th century is one of the milestones of European history—it reduced publishing time and expense so books became more plentiful. Until then, books had been hand copied or printed from blocks of wood on which raised ***characters*** (letters, numbers, and punctuation marks) and illustrations were laboriously carved in place on each page. The blocks were pressed against paper to produce printed pages. Movable type at that time used small wooden blocks with individual characters that could be rearranged and used repeatedly. This wood type was later replaced by metal type for durability.

The Linotype Machine Speeds Typesetting

The next important publishing innovation did not occur for four centuries. With the invention of the Linotype machine in the 1880s, publishers could set an entire line at once rather than only character by character. Although the process entailed melting lead, it reduced publishing costs and production time.

Offset Printing and Phototypesetting Modernize the Publishing Process

✔ *Offset printing*—Process by which an inked impression is taken from a photo mechanical plate, transferred to a rubber blanket, and printed on paper.

Publishing techniques did not advance significantly again until the 1950s and 1960s when several developments transformed publishing from a "hot type" process involving molten lead into a photographic "cold type" process that is faster and cleaner. At this time, several photographic printing processes using a flat plate rather than the raised type of earlier methods were introduced. The most important process was ***offset printing***, which is widely used today. Offset printing was soon joined by computer-based ***phototypesetting***, which projects images of columns of text onto photosensitive paper. The paper is developed, cut into sections, and pasted onto a sheet of heavy paper to produce a ***camera-ready page mechanical***—a pasteup of the complete page for offset printing. Illustrations are sized photographically and added as needed (Figure 1-1).

Terms to Remember

- *character*
- *phototypesetting*
- *offset printing*
- *camera-ready page mechanical*

Even this streamlined procedure requires the skilled operators and expensive equipment needed in Gutenberg's time. By the early 1980s, staff overhead presented a problem for a growing segment of the publishing industry: businesses, government offices, and

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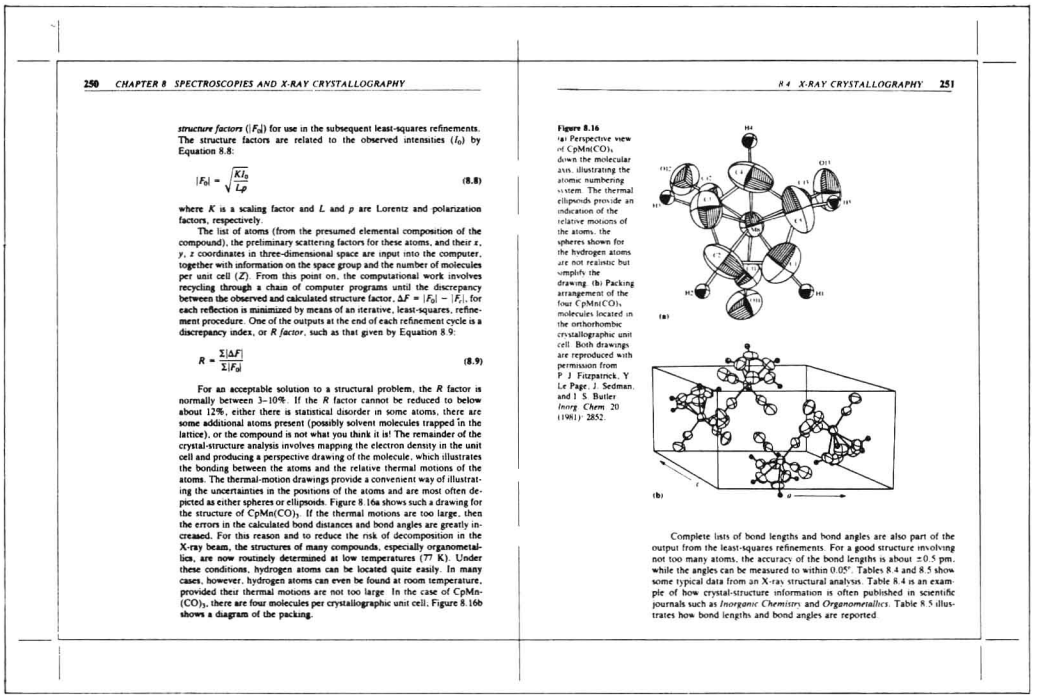

250 CHAPTER 8 SPECTROSCOPIES AND X-RAY CRYSTALLOGRAPHY

structure factors ($|F_0|$) for use in the subsequent least-squares refinements. The structure factors are related to the observed intensities (I_0) by Equation 8.8:

$$|F_0| = \sqrt{\frac{KI_0}{Lp}} \qquad (8.8)$$

where K is a scaling factor and L and p are Lorentz and polarization factors, respectively.

The list of atoms (from the presumed elemental composition of the compound), the preliminary scattering factors for these atoms, and their x, y, z coordinates in three-dimensional space are input into the computer, together with information on the space group and the number of molecules per unit cell (Z). From this point on, the computational work involves recycling through a chain of computer programs until the discrepancy between the observed and calculated structure factor, $\Delta F = |F_0| - |F_c|$, for each reflection is minimized by means of an iterative, least-squares, refinement procedure. One of the outputs at the end of each refinement cycle is a discrepancy index, or *R factor*, such as that given by Equation 8.9:

$$R = \frac{\Sigma||\Delta F|}{\Sigma|F_0|} \qquad (8.9)$$

For an acceptable solution to a structural problem, the R factor is normally between 3–10%. If the R factor cannot be reduced to below about 12%, either there is statistical disorder in some atoms, there are some additional atoms present (possibly solvent molecules trapped in the lattice), or the compound is not what you think it is! The remainder of the crystal-structure analysis involves mapping the electron density in the unit cell and producing a perspective drawing of the molecule, which illustrates the bonding between the atoms and the relative thermal motions of the atoms. The thermal-motion drawings provide a convenient way of illustrating the uncertainties in the positions of the atoms and are most often depicted as either spheres or ellipsoids. Figure 8.16a shows such a drawing for the structure of $CpMn(CO)_3$. If the thermal motions are too large, then the errors in the calculated bond distances and bond angles are greatly increased. For this reason and to reduce the risk of decomposition in the X-ray beam, the structures of many compounds, especially organometallics, are now routinely determined at low temperatures (77 K). Under these conditions, hydrogen atoms can be located quite easily. In many cases, however, hydrogen atoms can even be found at room temperature, provided their thermal motions are not too large. In the case of $CpMn(CO)_3$, there are four molecules per crystallographic unit cell; Figure 8.16b shows a diagram of the packing.

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Figure 8.16 (a) Perspective view of $CpMn(CO)_3$ down the molecular axis, illustrating the atomic numbering system. The thermal ellipsoids provide an indication of the relative motions of the atoms; the spheres shown for the hydrogen atoms are not realistic but simplify the drawing. (b) Packing arrangement of the four $CpMn(CO)_3$ molecules located in the orthorhombic crystallographic unit cell. Both drawings are reproduced with permission from P. J. Fitzpatrick, Y. Le Page, J. Sedman, and I. S. Butler, *Inorg. Chem.* 20 (1981): 2852.

Complete lists of bond lengths and bond angles are also part of the output from the least-squares refinements. For a good structure involving not too many atoms, the accuracy of the bond lengths is about ±0.5 pm, while the angles can be measured to within 0.05°. Tables 8.4 and 8.5 show some typical data from an X-ray structural analysis. Table 8.4 is an example of how crystal-structure information is often published in scientific journals such as *Inorganic Chemistry* and *Organometallics*. Table 8.5 illustrates how bond lengths and bond angles are reported.

Figure 1-1

Phototypeset copy and illustrations are pasted onto heavy paper to produce a page mechanical ready for offset printing.

educational institutions that had become major publishers of brochures, handbooks, catalogs, and other phototypeset publications.

Since few of these organizations could afford the $30,000 to $100,000 for computer-based publishing systems or salaries for typesetters and other publishing specialists, most sent copy outside for phototypesetting and printing. This made it difficult or impossible to complete documents on a tight schedule or to make last-minute changes. And, although the offset process greatly simplified page makeup, publication production remained tedious and time-consuming in light of the growing demand for more printed communications ever more quickly. It was clear that, despite vast improvements, the publishing process did not readily accommodate the requirements of late 20th-century business communications.

Bringing Publishing to the Desktop—A Second Publishing Revolution

Desktop publishing's introduction in 1985 gave businesses an affordable publishing system anyone could use. Compact enough to sit on a desktop, it consisted of three basic components:

- A microcomputer with a ***graphics interface***
- Page makeup software to place text and graphics files from other computer applications on a page

✔ *Graphics interface*—Computer-user interaction that emphasizes images rather than words to communicate.

Term to Remember

- *graphics interface*

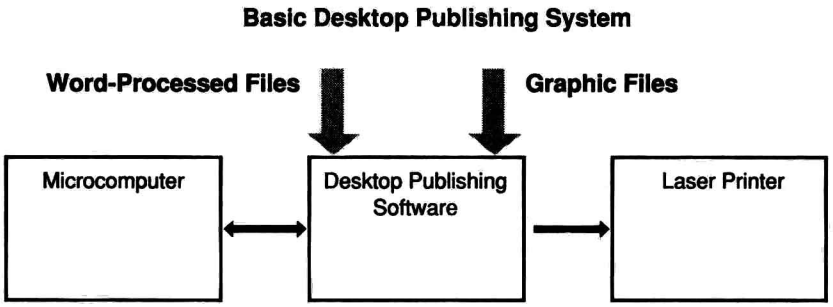

Figure 1-2

- A laser printer to print text and graphics in place on the page

Desktop publishing technology offered businesses a host of practical advantages.

- It reduced turnaround time to prepare publications for photocopying or commercial offset printing.
- It lowered the cost of a computer-based publishing system to around $10,000.
- It minimized the need for professional training and made it possible for nondesigners to create good-looking documents by themselves.

Why did desktop publishing emerge when it did? A powerful new microcomputer, the first page makeup software for a microcomputer, and an innovative laser printer all made it possible. Let's review these components.

Microcomputers: New Power

Desktop publishing demands a computer with a graphics interface so users can see the page as it is formatted. It also requires a high-speed microprocessor to redraw the screen without irritating delays and a high-resolution monitor to accurately represent text and graphics. Apple Computer's Macintosh was the first personal computer to meet these requirements (Figure 1-4).

Desktop Publishing Software: Integrated Text and Graphics

Within a few months of one another, several developers released page makeup software that brought text and graphics together on the page. Aldus Corporation's PageMaker was the most successful of the products, while Manhattan Graphics' ReadySetGo! gained popularity as it steadily improved.

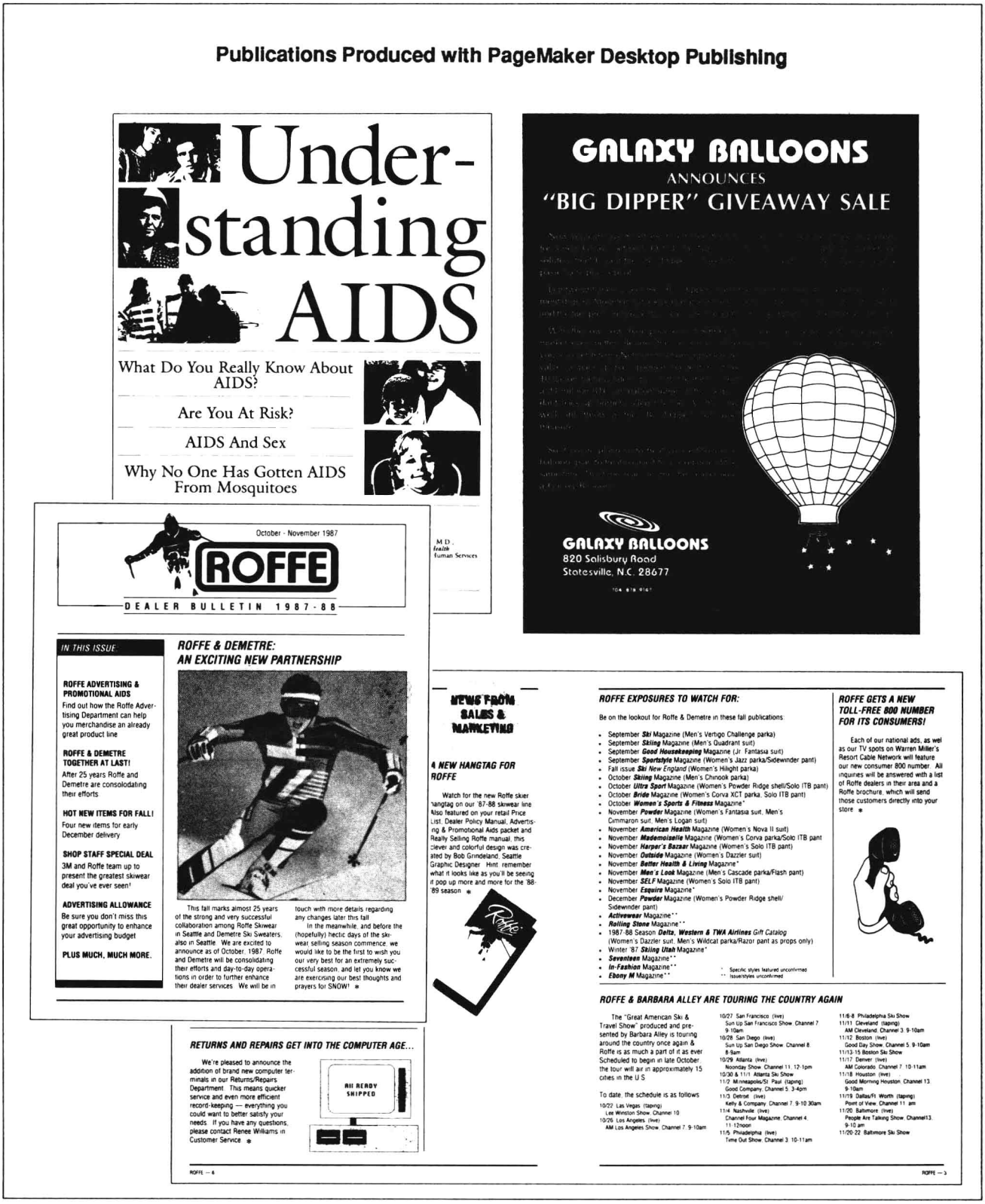

Figure 1-3

Desktop publishing speeds production of business communications as never before.

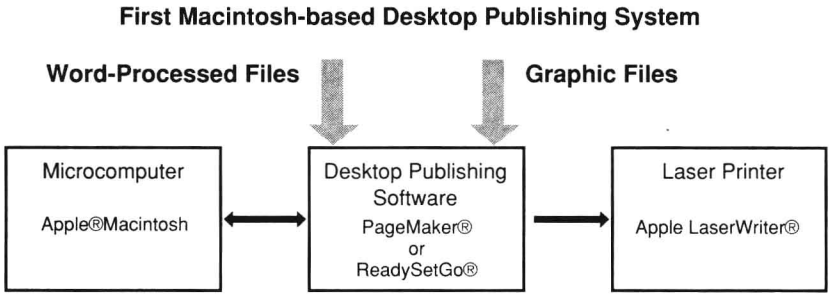

Figure 1-4

Laser Printers: Near-typeset Quality Output

Desktop publishing requires a laser printer for two reasons: (1) to print text that appears so nearly typeset ***(near-typeset quality)*** that it is appropriate for brochures, catalogs, and similiar documents; (2) to print a combination of text and graphics in place on the page. Standard dot-matrix and letter-quality printers cannot handle both tasks.

✔ *Resolution*—Sharpness of text or graphics on a screen or in printed form.

Laser printer ***resolution*** of 300 ***dots per inch (dpi)*** is sufficient to appear typeset to most readers; true typesetting ***(typeset quality)*** has a resolution of 1200 dpi and higher. Dots per inch refers to ***digitized output*** from typesetting devices (laser printers and phototypesetters) and ***scanners***—the greater the dpi, the higher the resolution. Figure 1-5 compares output in dots per inch from three common sources. Note that the higher the resolution, the more clearly defined the characters.

✔ *Digitized output*—Information about text and graphics stored for the computer as a collection of dots. Scanned images are one example of digitized output. (See below.)

✔ *Scanner*—Device that converts text and graphics into digital form—scanned images—so the computer can read them.

The Apple LaserWriter was especially suited to desktop publishing because it could print both a variety of type and pages filled with complex graphics. Its reliance on the new ***PostScript Page Description Language*** helped make this possible. A page description language describes the form and content of the page so the laser printer can reproduce images on paper; the PostScript language represents shapes using mathematical formulas, an approach especially suited to printing complex images.

Terms to Remember

- *near-typeset quality*
- *resolution*
- *dots per inch*
- *dpi*
- *typeset quality*
- *digitized output*
- *scanner*
- *PostScript Page Description Language*
- *imagesetter*

Imagesetters: True Typeset Quality Output

The PostScript-driven Linotronic 100 and 300, from Linotype Company, gave desktop publishers the option of printing their publications at true typeset resolution. Like a laser printer, the Linotronic series prints text and graphics in place on the page. It is called an ***imagesetter*** to differentiate it from phototypesetters that print only text.

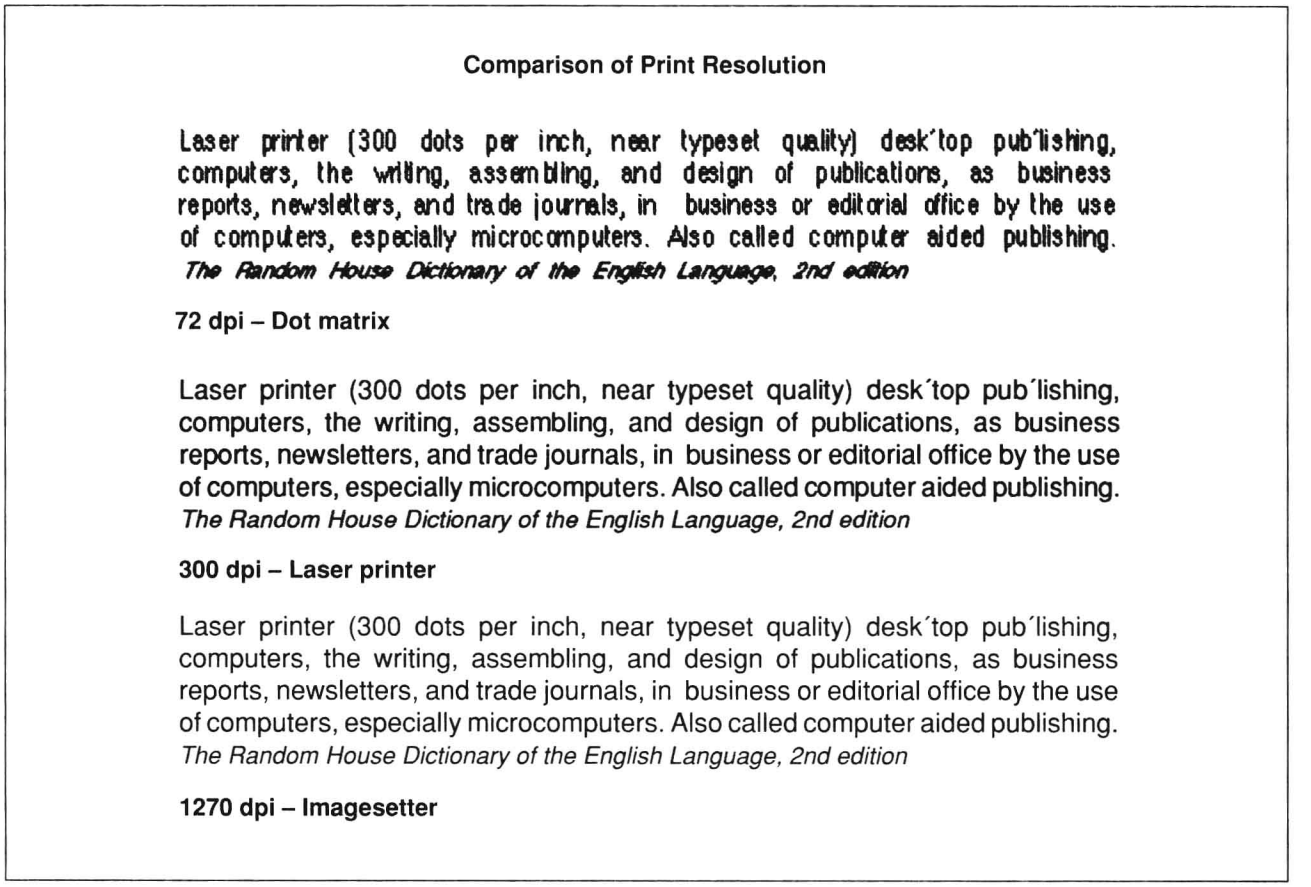

Figure 1-5

Although the LaserWriter's output is adequate for most printed communications, some require true typeset quality. The $30,000 or more required for Linotronic equipment meant few organizations could afford it, so ***service bureaus*** emerged to fill the breach. Now, documents could be proofed on a laser printer and then sent for overnight imagesetting, a minimal delay compared with the time needed for conventional phototypesetting.

✔ *Service bureau*—Center that offers desktop publishing services such as imagesetting, scanning, and conversion of PageMaker files between IBM and Macintosh versions.

Moving Desktop Publishing to the IBM PC

The first desktop publishing software for the IBM Personal Computer and compatibles, Ventura Publisher, was released late in 1986. A PC version of PageMaker was introduced several months later.

PC Terminology
Throughout the text, PC refers to any IBM Personal Computer or compatible system, including the IBM XT, AT, and the Personal System/2 unless otherwise noted.

The fact that the PC was developed primarily to handle business applications significantly affects the way desktop publishing programs function on it. For instance, a graphics interface must be added to run a desktop publishing application—PageMaker operates

Term to Remember
• *service bureau*

✔ *PCL*—Printer Control Language, the page description language used by most PC-compatible printers, including the Hewlett-Packard LaserJet series; PCL printers produce bitmapped images.

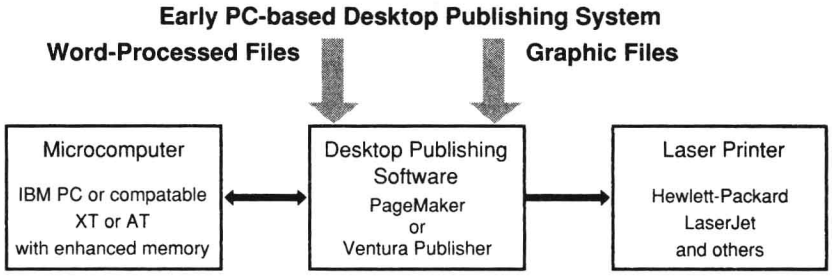

Figure 1-6

under ***Microsoft Windows***, and Ventura Publisher works under Digital Research's GEM environment. Enhanced memory is often required to speed the performance of power-hungry desktop publishing programs on PC XT and AT models.

PC Laser Printers: For Applications With Limited Graphics

✔ *Type font*—Complete set of characters of same size, style, and typeface as shown below. Fonts are covered in greater detail throughout the text.

ABCDEFGHIJKLMNOPQRS
TUVWXYZ
abcdefghijklmnopqestuv
wxyz
1234567890

Font: Times Roman, 10 point, italic

ABCDEFGHIJKLMOPQRS
TUVWXYZ
abcdefghijklmnopqrstuv
wxyz
1234567890

Font: Times Roman, 10 point, bold

Because PC-compatible laser printers were originally developed for word and numerical processing, they offered limited type selection and graphics capabilities. Such printers relied on the PCL (Printer Control Language) page description language to output ***bit-mapped type***, type produced by a dot-by-dot technique rather than the mathematical formulas used by PostScript. Bit-mapped ***type fonts*** meet word processing's demand for rapid printing, but their extensive memory requirements make it difficult to incorporate a variety of them into the printer. This presented no problem for word processing users, but it limited early desktop publishing choices.

Add-on ***font cartridges*** for printers such as the popular Hewlett-Packard LaserJet expanded user options, but even then word processing's moderate demands circumscribed choices. For example, even with cartridges, the LaserJet was restricted to printing type from 8 to 18 ***points*** in size (Figure 1-7). In contrast, the LaserWriter had built-in capacity for printing type from 4 to 127 points.

✔ *Point*—Type size measurement equal to 72 per inch, so a character 18 points in size is 1/4 inch tall. (See Figure 1-7.)

The graphics power of PC laser printers was similarly limited since word processing did not require graphics. For instance, LaserJet owners had to limit graphics to no more than 25 percent of the page to maintain 300 dpi resolution.

Terms to Remember

- *Microsoft Windows*
- *bit-mapped type*
- *PCL printer*
- *type font*
- *font cartridge*
- *point*

The Challenge of PC Compatability

Lack of standardization of hardware and software caused compatability problems throughout the PC market. The issue was especially acute for desktop publishing developers and users because desktop publishing interfaces with multiple components. Developers had to decide independently which graphics interface to use, which text and graphics applications and printers to support, and so on.

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